

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
7 August 2003 (07.08.2003)

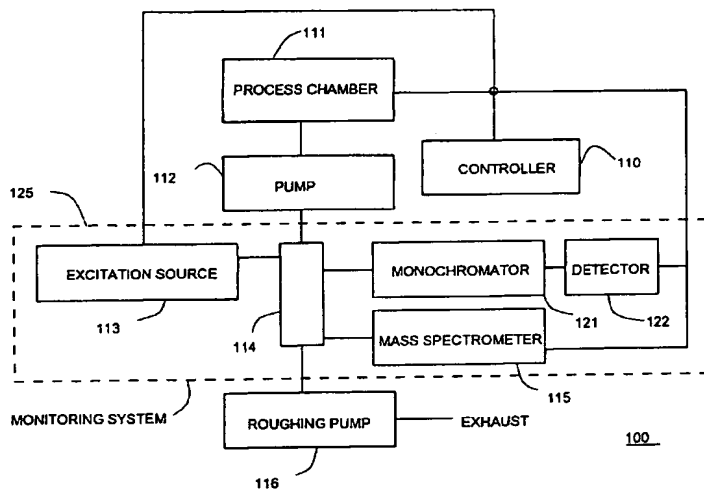
PCT

(10) International Publication Number
WO 03/065132 A2

- (51) International Patent Classification⁷: **G05B** (74) Agent: CASEY, Michael, R.; Oblon, Spivak, McClelland, Maier & Neustadt, P.C., 1940 Duke Street, Alexandria, VA 22314 (US).
- (21) International Application Number: PCT/US03/00047
- (22) International Filing Date: 28 January 2003 (28.01.2003) (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/352,210 29 January 2002 (29.01.2002) US
- (71) Applicant (*for all designated States except US*): TOKYO ELECTRON LIMITED [JP/JP]; TBS Broadcast Center, 3-6 Akasaka 5-chome, Minato-ku, Tokyo 107-8481 (JP).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): LUDVIKSSON, Audunn [IS/US]; 11580 East Desert Holly Drive, Scottsdale, AZ 85255 (US).
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR PROCESS MONITORING AND CONTROL



(57) Abstract: A method and apparatus for real-time monitoring of a gaseous environment during a semiconductor process. The method utilizes metastable electronic energy transfer to excite and ionize the chamber gaseous effluent and correlates the fluorescence signals from the excited species and mass spectroscopy analysis of the ions generated with the process status. In addition to the ability to produce excited species that fluoresce, the method has the ability to generate molecular ions from labile compounds, reduce fragmentation and operate at higher pressures than conventional ionization methods.

WO 03/065132 A2

WO 03/065132 A2



Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/00047

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01L 21/00

US CL : 250/281

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 250/281

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO APS EAST**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/0055649 A1 (OGURE et al) 27 December 2001 (27.12.2001), para. 0192.	1,7-15,17-20,23,24, 26-32
A	US 5,248,636 A (DAVIS et al) 28 September 1993 (28.09.1993), see entire document.	1,7-15,17-20,23,24, 26-32,35-38
A,P	US 2002/0016077 A1 (HWANGBO et al) 07 February 2002 (07.02.2002), para. 0034.	1-41

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patents published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

28 May 2003 (28.05.2003)

Date of mailing of the international search report

29 JUL 2003

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

ZIA HASHMI

Telephone No. (703) 308-0956